Space Weather Forecast

Issued on Saturday, 07 September 2024 at 13:12 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares likely through the period. Chance of G1/Minor Geomagnetic Storm conditions later Day 1 (07 Sep). Slightly increasing chance of S1/Minor Radiation Storms.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has increased to Moderate levels with a solitary Moderate flare, peaking 07/0746 UTC from a region in the southeast disc. There are currently nine sunspot regions on the visible disc with a large region now passed beyond the southwest limb. A broad region of sunspots in the southeast underwent slow development, with moderate magnetic complexity observed. Further moderately complex spots occupy the far southwest disc, but evolved only slowly. The remaining regions are either small, simple groups, or larger but mature areas.

A filament (arc of the Sun's plasma) erupted from the southeast disc on 06 Sep. The subsequent Coronal Mass Ejection (CME) that followed has been modelled and considered to pass well below Earth orbit. A further filament eruption in the southeast disc on 07 Sep appears to have resulted in another CME and will be analysed for any potential Earth-directed component once more imagery is available.

Solar Wind / Geomagnetic Activity: The solar wind varied between slow and slightly elevated speeds, generally between 350-420km/s. The Interplanetary Magnetic Field was predominantly Weak, but has strengthened to become persistently Moderate from around 07/0300 UTC. The important north-south component varied weakly and erratically throughout. Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is slowly easing following the rise in response to a flare on 01 Sep. It remains well below the S1/Minor Radiation Storm level though.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is likely through the period with a very slight chance of isolated Strong flares.

Solar Wind / Geomagnetic Activity: A CME that left the Sun on 07 Sep from the southeast disc is awaiting analysis to determine if there is an Earth-directed component. Otherwise, the onset of a weak high-speed stream associated with a coronal hole in the northern hemisphere is expected late Day 1 (07 Sep) or perhaps Day 2 (08 Sep), persisting until Day 3 (09 Sep), resulting in slightly elevated wind speeds. Otherwise mainly background wind speeds are expected.

Geomagnetic activity is forecast to be largely Quiet to Unsettled, but expected to reach Active levels later Day 1 (07 Sep), or perhaps Day 2 (08 Sep) with a chance of peak G1/Minor Storm (Kp5) conditions owing to the onset of the anticipated coronal hole fast wind. The forecast for the end of the period may change following analysis of the CME from 07 Sep, should any component be determined to be Earth-directed.

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Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is currently above normal background levels, but well below the S1/Minor radiation storm threshold. There is a slight chance (increasing to a chance from Day 3 (09 Sep) of the S1/Minor storm threshold being reached.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	10	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	65	65	65	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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